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PENSOFT

MUSEUM FÜR NATURKUNDE BERLIN

Illustrated catalogue of sphaeromatoid isopods (Crustacea, Malacostraca) in the Canadian Museum of Nature (CMN)

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Abstract

Zoological collections are major treasures representing the history of animal biodiversity on Earth and are an important resource for biodiversity and conservation research. The Canadian Museum of Nature (CMN) has one of the oldest crustacean collections in North America.

Here, we provide an illustrated catalogue of the superfamily Sphaeromatoidea Latreille, 1825, deposited in the Canadian Museum of Nature's Crustacea Collection (CMNC). In this paper, we report 18 species, belonging to 3 families and 14 genera. The majority of species belong to the family Sphaeromatidae with 16 species, followed by the Ancinidae and the Tecticipitidae each with one species. We present a bibliography of the original description, current taxonomic status, the type locality, geographic distribution, and an updated illustration for all species.

Key Words

Canada, CMNC, Isopoda, Sphaeromatoidea, taxonomy

Introduction

The superfamily Sphaeromatoidea Latreille, 1825, comprising the Ancinidae, Sphaeromatidae and Tecticiptidae, with almost 111 genera and 649 known species, is one of the most frequently encountered and diverse isopod taxa (Boyko et al. 2008 onwards). Within the Sphaeromatoidea, the family Sphaeromatidae Latreille, 1825, is the largest family of free-living marine Isopoda, with 622 species belonging to 108 genera occurring in the shallow-water marine environments, and many as yet undescribed species and genera. The two small sphaeromatoid families are the Ancinidae Dana, 1852, with 15 described species distributed across two genera, and the Tecticipitidae Iverson, 1982, with one genus and 12 valid species (Boyko et al. 2008 onwards).

The history of isopod taxonomy in North America dates back to Say (1818), Dana (1853), Oscar Harger (1880) and Verrill et al. (1873), as well as the massive contributions of, among others, Harriet Richardson, culminating in her 1905 monograph. While many of the species described by these early authors are valid, the brief species descriptions provided at the time have resulted in difficulties in recognizing species and subsequent misidentifications by later authors. Many species in most families remain to be fully described. Furthermore, there is a need to review many of the genera and the placement of species within these. The Canadian Museum of Nature (CMN) holds large collections across all animal groups. Based on the Canadian Museum of Nature database, the museum's Invertebrate Collection contains more than seven million specimens in more than 1.9 million lots. Of these, Amphipoda, Isopoda and Mysidacea are the major groups found in the Crustacean Collection (CMNC). Most of the specimens were collected by Edward L. Bousfield, who joined the CMN in 1950. Bousfield was a world authority on the systematics of Amphipoda; he described more than 300

new species (Conlan et al. 2016). Besides his intensive focus on the Amphipoda, his collections cover all sorts of invertebrates (mostly marine), as well as isopod crustaceans. With more than 3200 isopod records in the CMN database, including about 80 genera and 190 species (about 85% of which are from marine and brackish water habitats), in addition to the many samples yet to be catalogued, this collection is amongst the most important natural history archives for this group in North America. The present catalogue is a comprehensive, up-to-date account of the 18 species of sphaeromatoid isopods represented in the Canadian Museum of Nature, with illustrations of the species. This catalogue is arranged alphabetically by genus and then by species names within families, followed by the original combination, author(s) name and year of publication. For each species, a current nomenclature (valid names or synonymy) is given.

Material and method

Sphaeromatoid isopods for this study are from the Crustacean Collection of the Canadian Museum of Nature (**CMNC**; located at its Natural Heritage Campus, in Gatineau, Quebec, Canada).

Specimens were examined using Zeiss Stereomicroscope (Stemi 508). Color images of the specimens were taken using a Zeiss AxioCam ERc5s digital camera mounted on a Zeiss (Stemi 508) stereomicroscope. Photographs were merged and edited using Adobe Photoshop CC v.20.0.6.

Results

Systematics

Alphabetical list of taxa

Family Ancinidae Dana, 1852
Genus *Bathycopea* Tattersall, 1905

***Bathycopea daltonae* (Menzies & Barnard, 1959)**
Fig. 1A, B

Ancinus daltonae Menzies & Barnard, 1959: 31, fig. 25; Schultz 1973: 270–272, fig. 1D, G.

Bathycopea daltonae.– Loyola e Silva, 1971: 217–222, figs 5–7; Kussakin 1979: 369, fig. 229; Shimomura 2008: 26.

Type locality. The shelf off San Miguel Island, California.

Material examined. Canada. 1 ovigerous ♀ (5.2 mm), 2 ♂♂ (up to 5.1 mm); British Columbia, Vancouver Island, Barclay Land District, Cape Beale; 2 Aug. 1975; E.L. Bousfield leg.; CMNC 1985-0633. 4 ♂♂ (up to 5 mm); British Columbia, Barclay Land District, Trevor Ch.; 29 Jul. 1975; E.L. Bousfield leg.; CMNC 1985-0630. 1 ovigerous ♀ (4 mm); British Columbia, Barclay Land District, Trevor Ch.; 30 May 1977; E.L. Bousfield leg.; CMNC 1985-0634. USA. 2 ovigerous ♀♀ (up to 4.9 mm), 1 ♂ (4.25 mm); Washington, Clallam Co., Makah Bay; 31 July 1966; E.L. Bousfield leg.; CMNC 1991-2557.

Distribution. San Miguel Islands, southern California to Vancouver Island.

Family Sphaeromatidae Latreille, 1825
Genus *Amphoroidea* H. Milne Edwards, 1840

***Amphoroidea typa* H. Milne Edwards, 1840**
Fig. 1C

Amphoroidea typa Milne Edwards, 1840: 22–23; Dana 1853: 783; Hansen 1905: 108–126; Menzies 1962a: 140–141, fig. 47D; Hurley and Jansen 1977: 27 (listed as type species).

Type locality. Chile.

Material examined. Chile. 30 ♀♀ (up to 19.5 mm), 1 ♂ (16.5 mm); Magallanes-Antarctica Region, Isla Lennox; 5 Feb.1970; E.L. Bousfield & J.W. Markham leg.; CMNC 1992-0567.

Distribution. Known only from Chile.

Genus *Cassidinidea* Hansen, 1905

***Cassidinidea ovalis* (Say, 1818)**
Fig. 1D

Naesa ovalis Say, 1818: 484–485.
Cassidena lunifrons Richardson, 1900: 222.
Naesa ovalis Richardson, 1900: 224.
Cassidina lunifrons.– Richardson 1901: 533, fig. 14.
Cassidisca lunifrons.– Richardson 1905: 273, figs 283–284.
Cassidisca ovali.– Richardson, 1905: 274, figs 283, 205.
Cassidinidea ovalis.– Hansen, 1905: 130; Menzies and Frankenberg 1966: 44 fig. 20; Schultz 1969: 115, fig. 158; Kussakin 1979: 336, figs 199–200; Heard 1982: 32, fig. 35; Kensley and Schotte 1989: 208, fig. 92; Bruce 1994: 1151, fig. 45; Camp et al. 1998: 136; Kensley and Schotte 1999: 701–702; Khalaji-Pirbalouty and Bruce 2021: 494–502, figs 2–5.

Type locality. St John's River in Florida.

Material examined. USA. 4 ♂♂ (up to 3 mm), 8 ♀♀ (up to 3.2 mm); South Carolina, Georgetown County; 26 Apr. 1965; E.L. Bousfield leg.; CMNC 1992-0582. 1 ♂ (2.8 mm), 6 ♀♀ (up to 3.2 mm); South Carolina, Charleston County, 25 Apr. 1965; E.L. Bousfield leg.; CMNC 1991-2575. 2 ♀♀ (up to 3 mm); North Carolina, Dare County; 11 Apr. 1975; E.L. Bousfield leg.; CMNC 1985-0643. 1 ♀ (3.1 mm); North Carolina, Tyrrell County, 11 Apr. 1975; E.L. Bousfield leg.; CMNC 1985-0644.

Distribution. Eastern coast of North America from New Jersey to Florida (Khalaji-Pirbalouty and Bruce 2021).

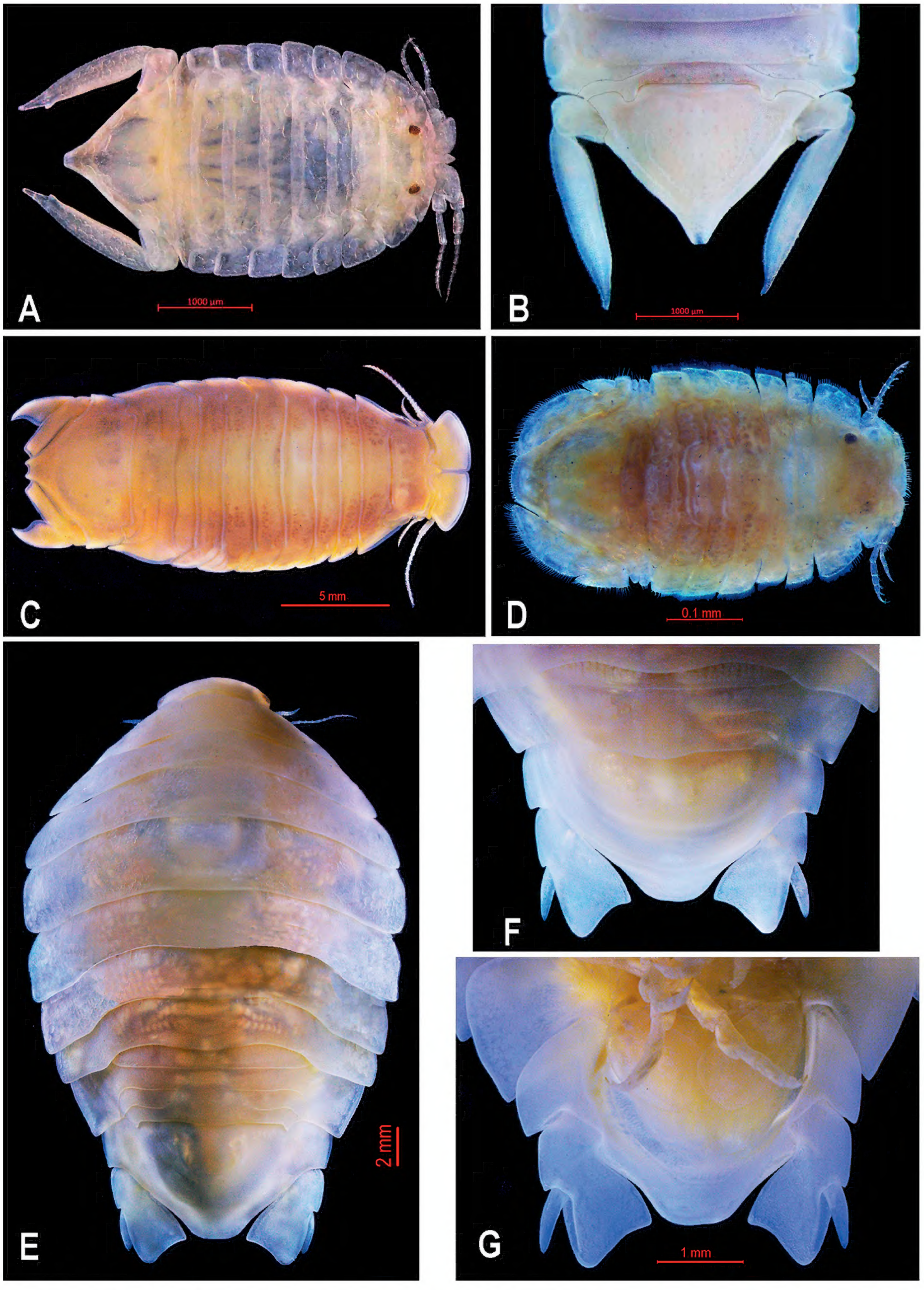

Figure 1. A. *Bathycopea daltonae* (Menzies & Barnard, 1959), male, (CMNC 1985-0633); **B.** Female, pleotelson; **C.** *Amphoroidea typa* Milne Edwards, 1840, female, (CMNC 1992-0567); **D.** *Cassidinidea ovalis* (Say, 1818) male, (CMNC 1992-0582); **E.** *Cassidinopsis emarginata* (Guérin-Méneville, 1843), male, (CMNC 1985-0636); **F.** Pleotelson dorsal view; **G.** Pleotelson ventral view.

Genus *Cassidinopsis* Hansen, 1905

Cassidinopsis emarginata (Guérin-Méneville, 1843)

Fig. 1, G

Cassidina emarginata Guérin-Méneville, 1843: 31; Cunningham 1871: 499, pl. 59, fig. 4; Miers 1879: 204; Studer 1883: 19; Pfeffer 1886: 63–69, pl. 2, figs 9–10, pl. 4, figs 23–30, pl. 6, figs 1–10; Dollfus 1891: 67, pl. 8, fig. 10; Stebbing 1900: 562; Ortmann 1911: 650.

Cassidinopsis emarginata – Hansen, 1905: 82, 87, 128; Hodgson 1910: 4; Tattersall, 1921: 223; Monod, 1931: 25–26; Stephensen 1947: 28; Vanhöffen 1914: 514; Menzies 1962a: 144, fig. 49; Carvacho, 1977: 177; Kussakin and Vasina1980: 356–360; Brandt 1998: 150, figs 9–11.

Cassidinopsis emarginatus.– Giambiagi, 1925: 233; Stebbing 1914: 351.

Type locality. Falkland Island. (Falkland Islands and the West coast of Patagonia).

Material examined. Chile. 1 ♂ (36 mm); Magallanes y de la Antártica Chilena Region, Isla Navarino, Punta Wulaia; 3 Feb. 1970; E.L. Bousfield leg.; CMNC 1985-0636. 18 ♂♂ and ♀♀ (up to 28 mm); Magallanes-Antarctica Region, Canal Beagle; 19 Feb. 1970; E.L. Bousfield leg.; CMNC 1985-0637. 1♀ (18 mm), 2 juveniles; Magallanes-Antarctica Region, Isla Lennox; 6 Feb. 1970; E.L. Bousfield leg.; CMNC 1985-0635.

Distribution. South Georgia Island, Falkland Islands to Southern coasts of Chile; Puerto Deseado, Argentina (Brandt 1998; Gomez Simes 1979).

Genus *Dynamene* Leach, 1814

Dynamene dilatata Richardson, 1899 (uncertain/ *incerta sedis*)

Fig. 2A, B

Dynamene dilatata Richardson, 1899: 882–883, fig. 8; Richardson 1905: 304, fig. 327; Schultz 1969: 122, fig. 171; Hatch 1947: 214, pl. 7, figs 85–86.

Dynamenella dilatata.– Kussakin, 1971: 450, fig. 298; Brusca et al. 2007: 521, 537, pl. 242.

Note. This species is retained in the genus *Dynamene* (in original combination) and listed as "taxon inquirendum" in WoRMS (Boyko et al. 2008 onwards). Thus, the correct generic status of this species is still in question. Since Richardson (1899; 1905) and subsequent authors provided only a brief description with a figure of the whole body, a morphological revision is required to correctly place this species.

Type locality. Monterey Bay, California.

Material examined. Canada. 3 ♀♀ (up to 6.5 mm); Oregon, Lincoln Co.; 12 Aug. 1966; E.L. Bousfield leg.; CMNC 1991-2567. 1 ovigerous ♀ (8.5 mm); British Columbia, Long Beach Unit, Long Beach; 5 Aug. 1955; E.L. Bousfield leg.; CMNC 1985-0648. 1 ♂ (5.5 mm); British Columbia, Long Beach Unit, Long Beach; 5 August 1955; E.L. Bousfield leg.; CMNC 1985-0660.

Genus *Dynamenella* Hansen, 1905

Dynamenella sheareri (Hatch, 1947)

Fig. 2C

Dynamene sheareri Hatch, 1947: 164, 262, fig. 173; George and Strömberg 1968: 246–248, pl. 2, fig. 9.

Dynamenella sheareri.– Schultz ,1969: 123, fig. 174; Harrison and Holdich 1982: 90.

Note. The true generic status of this species is still undetermined.

Type locality. Coos Bay, Oregon.

Material examined. Canada. 6 ♀♀ (up to 3 mm), 1 ♂ (3.8 mm); British Columbia, Renfrew Land Distr., Port Renfrew; 1 Aug. 1970; CMNC 1990-0069. 5 ♀♀ (up to 3.5 mm), 2 ♂♂ (4 mm), British Columbia, Vancouver Island, Barclay Land Distr., Bordelais Islets; 9 Aug. 1975; CMNC 1990-0070.

Remarks. *Dynamenella sheareri* cannot be a *Dynamenella* because of the following characters: having a single pleonal suture running to posterior margin (instead of two); penial process more fused, not basally swollen; appendix masculina is evenly slender and long, not "flask shaped."

Genus *Dynoides* Barnard, 1914

Dynoides canadensis Khalaji-Pirbalouty & Gagnon, 2021

Fig. 2D

Dynoides canadensis Khalaji-Pirbalouty & Gagnon, 2021: 12–20, figs 2–5.

Type locality. Canada, British Columbia.

Material examined. Canada. ***Holotype.*** ♂ (4.2 mm); British Columbia, Barclay Land District, Cape Beale; 19 July 1970; E.L. Bousfield leg.; CMNC 1985-0667.1. ***Paratypes.*** 4 ♂♂ (up to 4.2 mm), 18♀♀ (up to 4.3 mm), 1 ovigerous♀ (4.5 mm), same data as holotype; CMNC 1985-0667.2. 2 ♂♂ (up to 5 mm), 2 ovigerous ♀♀ (3.5 mm), 2 ♀♀ (3.5 mm); British Columbia, Sooke Land District, Whiffin Spit; 17 August 1955; E.L. Bousfield leg.; CMNC 1990-0064. 3 ♀♀ (up to 5 mm); British Columbia, Rupert Land Distr., Vancouver Island, Cape Scott; 18 July 1959; E.L. Bousfield leg.; CMNC 1990-0066. 20 ♂&♀; British Columbia, Renfrew Land Distr., Vancouver Island, Port Renfrew; 1 August 1970; E.L. Bousfield leg.; CMNC 1990-0068. 1♀ (3 mm); British Columbia, Queen Charlotte Islands Land Distr., Graham Island, 27 July 1957; E.L. Bousfield leg.; CMNC 1990-0067. 5 ♂♂ (up to 4.9), 6 ♀♀ (up to 4.2); British Columbia, Barclay Land District, Trevor Channel, Tzartus Island; 21 July 1970; E.L. Bousfield leg.; CMNC 1985-0664. 4 ♂♂ (up to 4.5 mm), 5 ♂♂ (up to 4.2 mm), British Columbia, Metchosin Land Distr., Sooke Basin, Becher Bay; 31 July 1970; E.L. Bousfield leg.; CMNC 1990-0057. 4♂♂ (up to 4.5 mm), 2 ♀♀ (3 mm), British

Columbia, Nootka Land Distr., Nootka Island; 20 August 1959; E.L. Bousfield leg.; CMNC 1990-0059. 1 ♂ (4.2 mm), 1 ♂ (3.5 mm), British Columbia, Rupert Land Distr., Hope Island; 22 August 1959; E.L. Bousfield leg.; CMNC 1990-0060. 1 ♂ (5.1 mm), 5 ♂♂ (up to 4 mm), 1 juvenile, British Columbia, Range 2 Coast Land Distr., Goose Island; 6 August 1964; E.L. Bousfield leg.; CMNC 1990-0061. 6 ♀♀ (up to 3 mm), British Columbia, Range 2 Coast Land Distr., Hunter Island; 8 August 1964; E.L. Bousfield leg.; CMNC 1990-0063. 8 ♂♂ (up to 5 mm), 20 ♀♀ (up to 4.1 mm), 10 juveniles, British Columbia, Range 3 Coast Land Distr., Princess Royal Island; 20 July 1964; E.L. Bousfield leg.; CMNC 1990-0065.

Distribution. Western coasts of British Columbia from Victoria area to Graham Island.

Genus *Exosphaeroma* Stebbing, 1900

Exosphaeroma gigas (Leach, 1818)

Fig. 2E, F

Sphaeroma gigas Leach, 1818: 346–347; Desmarest 1825: 301; Milne-Edwards 1840: 205; White 1847: 102; Dana 1853: 775; Miers 1879: 202–203; Haswell 1882: 287; Studer 1884: 17–18; Dollfus 1891: 62, pl. 8a, fig. 6.

Sphaeroma jurinii.– Krauss, 1843: 65.

Sphaeroma propinqua.– Nicolet, 1849: 277–278.

Sphaeroma chilensis.– Dana, 1853: 195–196.

Sphaeroma obtusa.– Hutton, 1879 (in Chilton 1906).

Exosphaeroma gigas.– Stebbing, 1900: 553–558, pl. 39; Chilton 1906: 271–272; Ortmann 1911: 646–647; Vanhöffen1914: 510–511; Tattersall 1921: 216; Giambiagi 1925: 235; Stephensen 1927: 362; Nierstrasz 1931: 194; Barnard 1940: 413, fig. 13; Hurley 1961: 269; Hale 1929: 275, fig. 273; Menzies 1962a: 132–134, fig. 43; Kussakin 1967: 235; Hurley and Jansen 1977: 58, fig. 52; Carvacho, 1977: 177–178; Kussakin and Vasina1980: 355–359; Brandt and Wägele 1989: 209–214. figs 5–9; Bruce 2003: 368.

Type locality. Unknown; The Natural History Museum, syntypes: 1941: 6:27: 5 (presented by Leach) and 1979: 420: 1, Sir Joseph Banks collection (Ellis 1981).

Material examined. Chile. 22 ♂♂ (up to 24 mm), 50 ♀♀ (up to 18 mm); Magallanes and Chilean Antarctica Region, Picton Island; 7 Feb. 1970; E.L. Bousfield leg.; CMNC 1990-0090. 46 ♂♂ and ♀♀; Magallanes and Chilean Antarctica Region, Navarino Island; 29 Jan. 1970; E.L. Bousfield leg.; CMNC 1990-0092. 300 ♂♂ and ♀♀; Magallanes and Chilean Antarctica Region, Canal Beagle; 19 Feb. 1970; E.L. Bousfield leg.; CMNC 1990-0094. Falkland. 1♀ (16 mm); Atlantic Ocean, Falkland Island, East Falkland; 1 Feb. 1969; S.W. Gorham leg.; CMNC 1992-0545. 9 ♂♂ and ♀♀ (up to 18 mm); East Falkland; 25 Jan. 1967; S.W. Gorham leg.; CMNC 1992-0552.

Distribution. Magallanes and Chilean Antarctica Region, Tierra del Fuego, Falkland Islands, Crozet Islands, Kerguelen Islands, Peru, South Africa, South Australia, New Zealand (Chatham Rise, Macquarie Island, Auckland Island, Campbell Island), Tasmania (Dana 1853; Vanhöffen 1914; Tattersall 1914; Kussakin 1967; Brandt and Wägele 1989).

Exosphaeroma rhomburum (Richardson, 1899)

Fig. 2G

Sphaeroma rhomburum Richardson, 1899: 835–836, fig. 12; 1900: 222.

Exosphaeroma rhomburum.– Richardson, 1905: 290, fig. 303; Nierstrasz 1931: 195; Schultz 1969: 135, fig. 197; Kussakin 1971: 402, fig. 257; Bruce 2003: 369.

Type locality. Monterey Bay, California.

Material examined. USA. 3 ♂♂ (up to 4.1 mm), 2 ovigerous ♀♀ (up to 4.2 mm); Washington, Clallam Co., Makah Bay; 31 July 1966; E.L. Bousfield leg.; CMNC 1991-2559. Canada. 4 ♂♂ (up to 4.5 mm), 4 ♀♀ (up to 5 mm); British Columbia, Range 5 Coast; 13 July 1964; E.L. Bousfield leg.; CMNC 1984-1535. 3 ♂♂ (up to 4.1 mm), 4 ♀♀ (up to 4.5 mm); British Columbia, Rupert Land Distr., Hope Island; 22 July 1959; E.L. Bousfield leg.; CMNC 1984-1537. 1 ♀ (4 mm); Alaska, Prince of Wales-Outer Ketchikan Census Area; 31 May 1961; E.L. Bousfield leg.; CMNC 1991-2501.

Distribution. Monterey Bay, California, Washington to British Columbia.

Exosphaeroma russellhansoni Wall, Bruce & Wetzer, 2015

Figs 2H, 3A, B

Exosphaeroma russellhansoni Wall, Bruce & Wetzer, 2015: 28–33, figs 9–12.

Type locality. Washington, Puget Sound, Seattle, Smith Cove.

Material examined. Canada. 15 ♂♂ (up to 6.2 mm); British Columbia, Esquimalt Land Distr., Esquimalt; 30 July 1970; E.L. Bousfield leg.; CMNC 1984-1465. 2 ♂♂ (5.1, 5.5 mm); British Columbia, Queen Charlotte Islands Land Distr., Yakan Pt.; 25 Aug. 1975; E.L. Bousfield leg.; CMNC 1984-1445. 3 ♂♂ (up to 6 mm); Land Distr., Graham Island; 11 Aug. 1975; E.L. Bousfield leg.; CMNC 1984-1447. 4 ♂♂ (up to 5.8 mm), 2 ♀♀ (up to 4.8 mm); British Columbia, Range 3 Coast Land Distr., Princess Royal Island; 20 July 1964; E.L. Bousfield leg.; CMNC 1984-1448. 5 ♂♂ (up to 6.5 mm), 2 ♀♀ (up to 4.8 mm); British Columbia, Metchosin Land Distr., Witty's Lagoon; 28 July 1964; E.L. Bousfield leg.; CMNC 1984-1449. 16 ♂♂ (up to 6 mm), 3 ♀♀ (up to 5 mm); British Columbia, Range 3 Coast Land Distr., Lady Douglas Island; 9 July 1964; E.L. Bousfield leg.; CMNC 1984-1452. 4 ♂♂ (up to 6.1 mm), 4 ♀♀ (up to 4.1 mm); British Columbia, Range 3 Coast Land Distr., Miles Island; 5 Aug. 1964; E.L. Bousfield leg.; CMNC 1984-1452. 2 ♂♂ (up to 6.5 mm); British Columbia, Range 5 Coast Land Distr., Stephens Island; 12 July 1964; E.L. Bousfield leg.; CMNC 1984-1455. 4 ♂♂ (up to 6.8 mm),

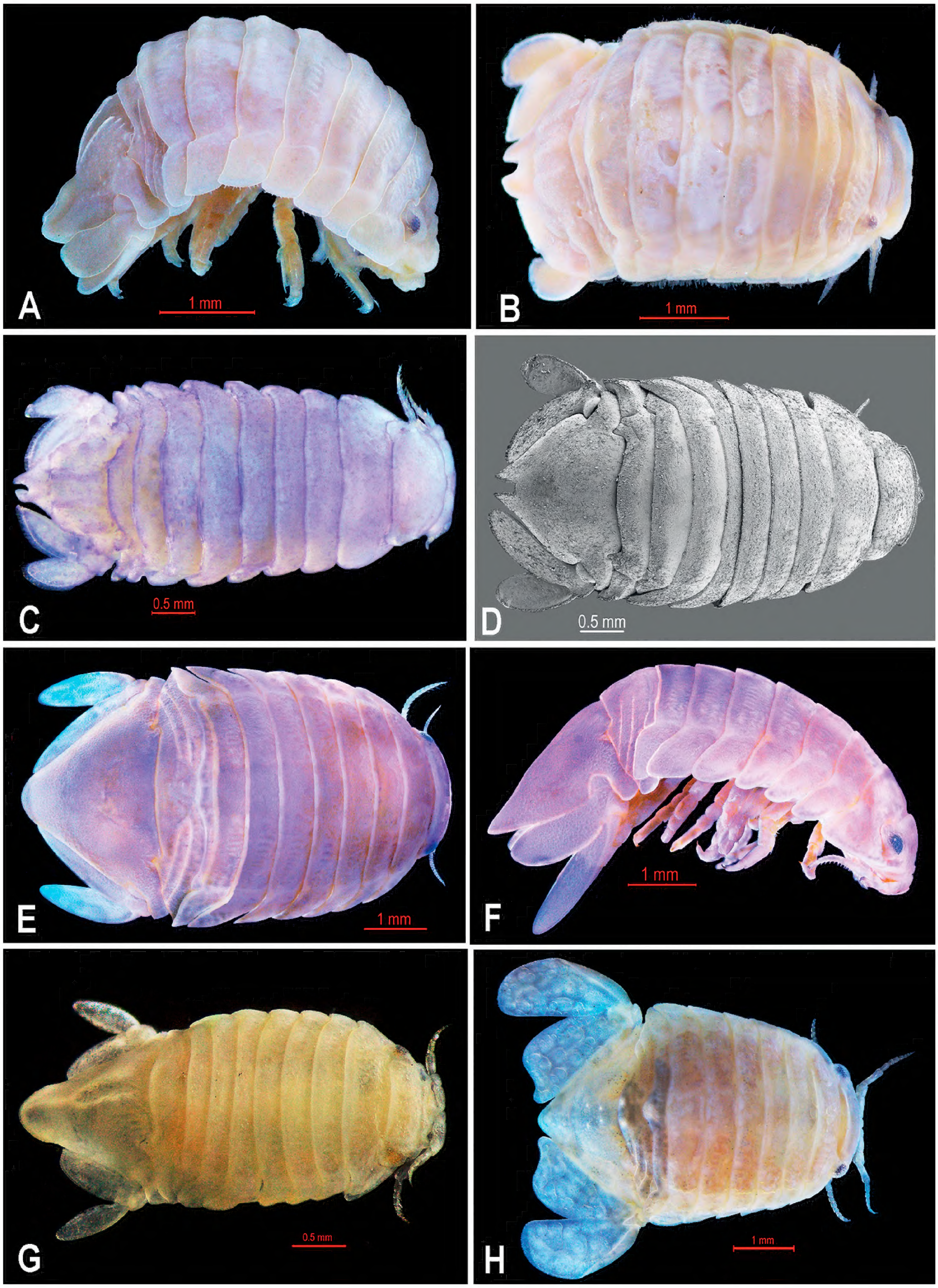

Figure 2. *Dynamene dilatata* Richardson, 1899, female, (CMNC 1991-2567). **A.** Lateral view; **B.** Dorsal view; **C.** *Dynamenella sheareri* (Hatch, 1947), male, (CMNC 1990-0070); **D.** *Dynoides canadensis* Khalaji-Pirbalouty & Gagnon, 2021, (CMNC 1985-0667b). *Exosphaeroma gigas* (Leach, 1818), male, (CMNC 1990-0090); **E.** Dorsal view; **F.** Lateral view. *Exosphaeroma rhomburum* (Richardson, 1899), male, (CMNC 1991-2559); **H.** *Exosphaeroma russellhansoni* Wall, Bruce & Wetzer, 2015, male, (CMNC 1984-1465).

1 ♀ (5.5 mm); British Columbia, Rupert Land Distr.; 7 Aug. 1959; E.L. Bousfield leg.; CMNC 1984-1461. 6 ♂♂ (up to 6.1 mm), 3 ♀♀ (up to 5 mm); British Columbia, Vancouver Island, Barclay Land Distr.; 8 September 1975; E.L. Bousfield leg.; CMNC 1984-1463. USA. 10 ♂♂ (up to 6.5 mm); Washington, Jefferson Co. (WA), Marrowstone Island; 26 July1966; E.L. Bousfield leg.; CMNC 1984-1456.

Exosphaeroma studeri Vanhöffen, 1914

Fig. 3C, D

Exosphaeroma studeri Vanhöffen, 1914: 510–511, fig. 44; Menzies 1962a: 132–133, fig. 43; Nierstrasz 1931: 195; Bruce 2003: 369.

Sphaeroma calcarea.– Dollfus 1891: 64, pl. 8, fig. 7. [Not *Sphaeroma calcarea* Dana, 1853; misidentification, according to Menzies 1962a].

Type locality. Punta Arenas, Chile.

Material examined. Chile. 1 ♂ (17.1 mm), 1 ovigerous ♀ (14.5 mm); Banco de las Taeas, Isla, Navarino; 5 Feb. 1970; E.L. Bousfield leg.; CMNC 2023-0242. 1 ♂ (18 mm) 5 ♀♀ (up to 12 mm); Canal Beagle; 19 Feb. 1970; E.L. Bousfield leg.; CMNC 2023-0243. 2 ♂♂ (9 mm), 3 ♀♀ (up to 6 mm); Isla Navarino; 5 Feb. 1970; E.L. Bousfield leg.; CMNC 2023-0244. 1 ♂ (9.8 mm); Peninsula Scott; W. Bank LW-HW; 20 Feb. 1970; E.L. Bousfield leg.; CMNC 2023-0245. 1 ♂ (15 mm), 2 subadult ♂♂ (13 mm), 3 ♀♀ (up to 13 mm); Islotes, Mamones, off Isla Lennox; 6 February 1970; E.L. Bousfield leg.; CMNC 2023-0246. 2 ♀♀ (up to 9.1 mm); Punta Robalo, Isla, Navarino; 29 Jan. 1970; E.L. Bousfield leg.; CMNC 2023-0247.

Distribution. Chile, Straits of Magellan (Menzies, 1962a).

Genus *Gnorimosphaeroma* Menzies, 1954

Gnorimosphaeroma oregonense (Dana, 1853)

Fig. 3E, F

Spheroma oregonensis Dana, 1853: 778, pl. 52x; Richardson 1899: 836; 1900: 223.

Sphaeroma olivacea.– Lockington, 1877: 45, pl. 1.

Exosphaeroma oregonensis.– Richardson, 1905: 296, figs 315, 316; Hatch, 1947: 213, Pl. 6, figs. 82, 83.

Neosphaeroma oregonense.– Monod, 1931: 76, fig. 74.

Gnorimosphaeroma oregonensis.– Miller, 1968: 12; Hoestlandt 1969: 325; Schultz 1969: 129, fig. 187; Kussakin 1971: 406–408, fig. 260–262; Hoestlandt 1975: 31; Brusca et al. 2007: 537, pl. 243; Wetzer et al. 2021: 32, figs 1–9 (Neotype designation).

Gnorimosphaeroma oregonensis lutea.– Menzies, 1954: 406, figs 1–4, 6A–P; Riegel 1959: 154–161, fig. 1A.

Gnorimosphaeroma oregonensis oregonensis.– Menzies, 1954: 406, figs 5, 7A–E, 12; Riegel 1959: 154–161, fig. 1B.

Note. Latest synonymies to the species can be found in Wetzer et al. (2021).

Material examined. Canada. 50 ♂♂ (up to 9.5 mm), 7 ♀♀ (up to 6 mm); British Columbia, Sayward Land Distr., Gowlland Island; 8 Jul. 1983; F. Rafi leg.; CMNC 1985-0715. 16 ♂♂ (up to 9.5 mm), 42 ♀♀ (up to 7 mm); British Columbia, Nootka Land Distr.; 13 June 1976; R.M. O'Clair leg.; CMNC 1987-0201. 75 ♂ & ♀; British Columbia, Sayward Land Distr.; 30 Aug. 1984; F. Rafi leg.; CMNC 1986-0206. 6 ♂♂ (up to 9 mm), 10 ♀♀ (up to 6 mm); British Columbia, Comox Land Distr.; 28 Jul. 1959; E. L. Bousfield leg.; CMNC 1987-0141. 97♂&♀; Alaska, Juneau Borough; 13 Jun. 1961; E. L. Bousfield leg.; CMNC 1987-0146. USA. 21♂&♀; Washington, Mason Co. (WA); 17 Jul. 1966; E. L. Bousfield leg.; CMNC 1991-2543.

Distribution. Widely distributed in North America from Alaska, British Columbia, and Vancouver to Washington (Kussakin 1979; Wetzer et al. 2021).

Genus *Ischyromene* Racovitza, 1908

Ischyromene menziesi (Sivertsen & Holthuis, 1980)

Fig. 3G, H

Dynamenella menziesi Sivertsen & Holthuis, 1980: 41–48, figs 6–8, pl. 1.

Ischyromene menziesi.– Harrison & Holdich, 1982: 86. [New combination]; Bruce 2006: 20; González et al. 2008: 174.

Dynamenella eatoni.– Menzies, 1962a: 135, fig. 44. [Not *Dynamene eatoni* Miers, 1875; misidentification, according to Harrison and Holdich 1982].

Type locality. Tristan da Cunha Island, south Atlantic Ocean.

Material examined. Chile. 1 ♂ (11 mm); Magallanes-Antarctica Region, Isla Lennox; 6 Feb.1970; E. L. Bousfield leg.; CMNC 1985-0652. 1 subadult ♂ (9 mm), 1 Ovi. ♀ (9 mm), 2 ♀♀ (10 mm, 19 mm); Magallanes-Antarctica Region, Isla Hoste; 4 Feb. 1970; E. L. Bousfield leg.; CMNC 1985-0653. 2 ♂♂ (10 mm), 2 ♀♀ (9 mm); 5 juveniles; Magallanes-Antarctica Region, Isla Picton; 7 Feb. 1970; E. L. Bousfield leg.; CMNC 1985-0655. 10 Juveniles; Magallanes-Antarctica Region, Canal Beagle; 19 Feb. 1970; E. L. Bousfield leg.; CMNC 1985-0656.

Distribution. Chile, South Atlantic Ocean (Tristan da Cunha, Nightingale, and Stoltenhoff Islands).

Genus *Paracerceis* Hansen, 1905

Paracerceis sculpta (Holmes, 1904)

Fig. 4A, B

Dynamene sculpta Holmes, 1904: 300–302, pl. 34, figs. 1–7.

Cilicaea sculpta.– Richardson, 1905: 318–319, fig. 349.

Paracerceis sculpta.– Richardson, 1905: 9; Menzies 1962b: 340, 341, fig. 2; Miller 1968: 14, fig. 3.; Brusca et al. 2007: 537, pl. 243.

Note. Latest synonymies to the species can be found in Martínez-Laiz et al. (2018).

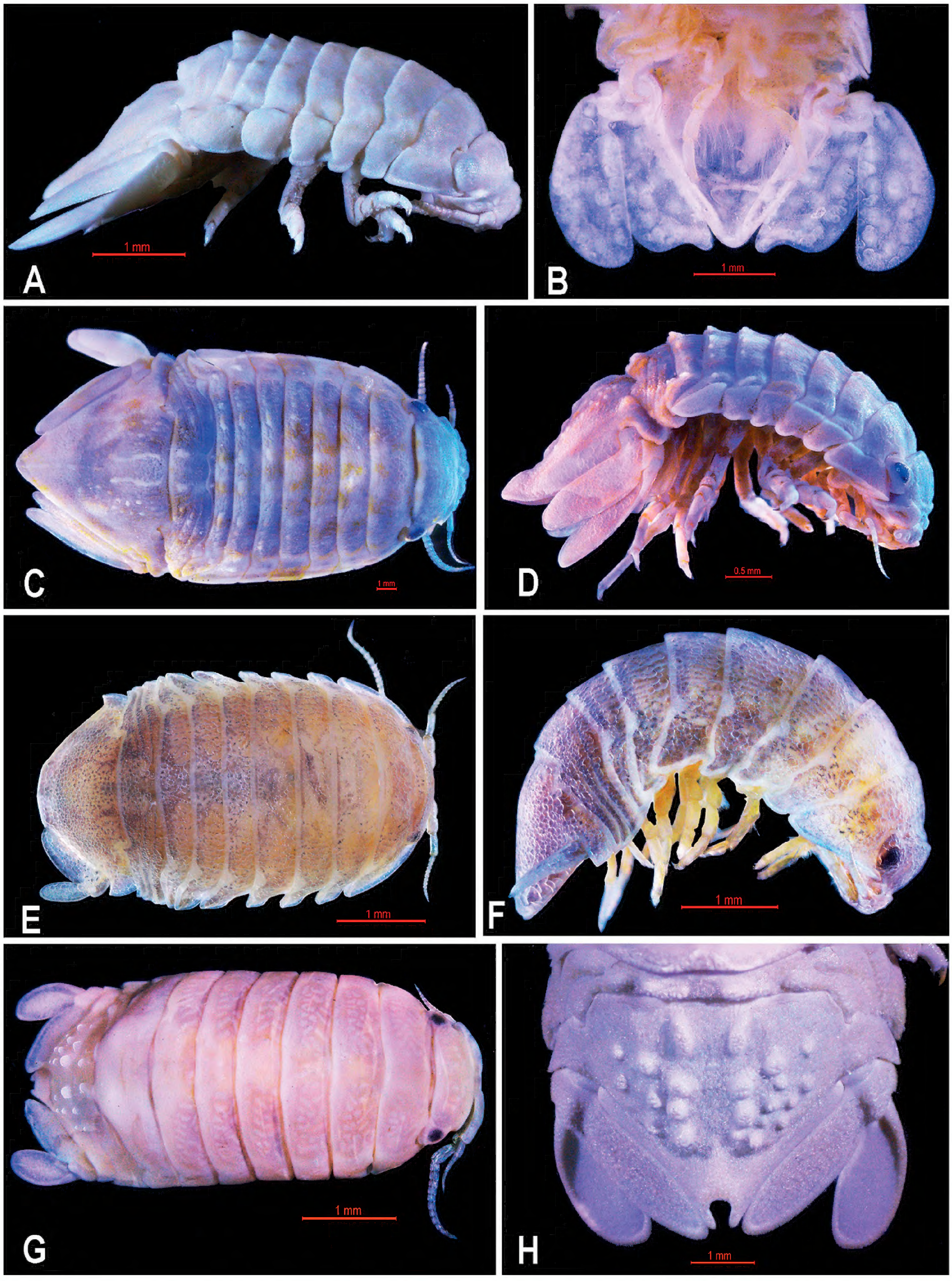

Figure 3. *Exosphaeroma russellhansoni* Wall, Bruce & Wetzer, 2015, male, (CMNC 1984-1465). **A.** Lateral view; **B.** Ventral view. *Exosphaeroma studeri* Vanhöffen, 1914, male, (CMNC 023-0242); **C.** Dorsal view; **D.** Lateral view. *Gnorimosphaeroma oregonense* (Dana, 1853), male, (CMNC 1985-0715); **E.** Dorsal view; **F.** Lateral view. *Ischyromene menziesi* (Sivertsen & Holthuis, 1980), male, (CMNC 1985-0652); **G.** Dorsal view; **H.** Pleotelson, dorsal view.

Type locality. San Clemente Island; San Diego, California.

Material examined. 1 ♂ (5.1 mm); Caribbean Sea; 15 Mar. 1968; N.A. Powell; CMNC 1992-0513. 2 ♂♂ (5 mm, 5.2 mm), 8 ♀♀ (up to 4.9 mm); Hawaiian Islands, Coconut Island; 1 Mar. 1962; D.C. Matthews leg.; CMNC 2023-0248. 3 ♀♀ (up to 4.5); Radio Island, North Carolina, 31 Mar. 1975; M.C. Govern leg.; CMNC 2023-0249.

Distribution. This species is widely distributed along the North American Pacific coast from southern California in San Diego to Mexico (Menzies 1962b); Pakistan, in the Indian Ocean (Yasmeen and Javed 2001); Hawaii, Hong Kong, Japan, Australia, Argentina, Brazil and the Azores (mid –Atlantic Ocean); in the Mediterranean Sea from Tunisia, Italy, Greece, France, Malta, Cyprus and Turkey. The wide distribution is most likely correct and results from ship-borne translocations. (Ulman et al. 2017; Martínez-Laiz et al. 2018; Rumbold et al. 2018).

Genus *Paradella* Harrison & Holdich, 1982

Paradella dianae (Menzies, 1962)

Fig. 4C, D

Dynamenopsis dianae Menzies, 1962b: 341, fig. 3.
Dynamenella dianae.– Menzies & Glynn, 1968: 63, 113, fig. 3.
Paradella dianae.– Harrison & Holdich, 1982: 104, fig. 6.
Paradella quadripunctata.– Van Dolah et al. 1984: 52.

Note. A comprehensive synonymy to the species can be found in Martínez-Laiz et al. (2018: 8–10).

Type locality. The Bay of San Quintin, Baja California.

Material examined. USA. 4 ♂♂ (up to 7.5 mm); 3 ♀♀ (up to 5 mm); Carteret County, North Carolina; 8 Apr. 1975; E. L. Bousfield leg.; CMNC 1990-0073.

Distribution. Baja California (Menzies 1962b), Italy, Egypt, Spain, Cyprus, Turkey, Libya Pakistan (Arabian Sea); Cádiz Bay, Caleta Vélez, Motril, Barbate (Spain), Australia (Menzies 1962b; Ulman et al. 2017; Martínez-Laiz et al. 2018). Its presence in different parts of the world, especially port cities, indicates a transport via shipping.

Genus *Sphaeroma* Bosc, 1802

Sphaeroma quadridentatum (Say, 1818)

Fig. 4E

Sphaeroma quadridentata Say, 1818: 400–401; De kay 1844: 44; White 1847: 102; Harger 1873 in Verrill, Smith and Harger 1873: 275, pl.5, fig. 21; Kensley and Schotte 1989: 234, fig. 10.
Sphaeroma quadridentatum.– Harger 1880: 368–370, pl. 9, figs. 53, 54; Smith 1964: 103, pl. 15, fig. 27; Miller 1968: 8, fig. 3; Schultz 1969: 128, fig. 183; Kussakin 1971: 394, fig. 248;

Type locality. Saint Catherine's Island, Georgia.

Material examined. USA. 4 ♂♂ (up to 6 mm); 2 ♀♀ (up to 5 mm); Virginia, Gloucester; 17 Apr. 1975; E. L. Bousfield leg.; CMNC 1992-0583. 4 ♂♂ (up to 6 mm); 8 ♀♀ (up to 5 mm); Pawley's Greek, Carolina; 17 Mar. 1915; E. L. Bousfield leg.; CMNC 2023-0250. 2 ♂♂ (up to 6 mm); 3 ♀♀ (up to 5.5 mm); South Carolina; 16 May 1975; D.R. Calder leg.; CMNC 2023-0251.

Distribution. Georgia, Florida, Long Island Sound, Connecticut, New Haven County, West Haven, Savin Rock. It is common on the southern shore of New England (Harger 1880; Kensley and Schotte 1989).

Sphaeroma terebrans Bate, 1866

Fig. 4F

Sphaeroma terebrans Bate, 1866: 28, pl. 2, fig. 5; Stebbing 1904: 16; Richardson 1905: 282–286, figs. 294–298; Calman 1921: 217–218; Baker 1926: 247–278; Nierstrasz 1931: 192; Van Name 1936: 447–449, fig. 279; Barnard 1940: 405; Pillai 1954: 9; Pillai 1955: 129–131, Pl. 6, figs 1–11; Loyola e Silva 1960: 14–28, figs 1, 2; John 1968: 1–73, pl. 1, figs 1–36; Miller 1968: 11, fig. 3; Harrison and Holdich 1984: 287–292, fig. 4; Kensley and Schotte 1989: 234, fig. 10; Wilkinson 2004: 1; Baratti et al. 2005: 225–234; Li et al. 2016: 307, fig. 2.
Sphaeroma destructor Richardson, 1897: 105–107.

Type locality. India.

Material examined. USA. 3 ♂♂ (up to 9 mm); South Carolina, Charleston Co.; 25 Apr. 1965; E. L. Bousfield leg.; CMNC 1991-2576. NIGERIA. 15 ♂♂ (up to 9 mm); 30 ♀♀ (up to 7 mm); Mayuku Creek; 5 Oct. 1975; C. Powell leg.; CMNC 2023-0252.

Distribution. Virginia to Louisiana; Belize; Cuba; Venezuela to Brazil; Gulf of Mexico; Kenya, Nigeria, Tanzania, Zanzibar, east coast of southern Africa, Pakistan, India, Sri Lanka, Thailand, Indonesia, Philippines, Australia, China (Kensley and Schotte 1989; Wilkinson 2004; Li et al. 2016).

Family Tecticipitidae Iverson, 1982
Genus *Tecticeps* Richardson, 1897

Tecticeps convexus Richardson, 1899

Fig. 4G, H

Tecticeps convexus Richardson, 1899: 837–838, fig. 15; Richardson 1905: 278–280, figs 290–291; Richardson 1906: 4, figs 6–9; Schultz 1969: 116, fig. 161; Kussakin 1971: 347, figs 210, 211; Brusca et al. 2007: 538.

Type locality. Monterey Bay, California.

Material examined. ALASKA. 10 ♂♂ (up to 9 mm); 25 ♀♀ (up to 10.5 mm); Sitka Borough, Chichagof Island; 30 Jul. 1980; G. Peter & G. Ronald leg.; CMNC 1992-0541. Canada. 15 ♂&♀; British Columbia, Range 4 Coast Land Distr., Banks Island;18 Jul. 1964; E. L. Bousfield leg.; CMNC 1991-2583. 19 ♂&♀; British Columbia, Range 2 Coast Land Distr., Goose Island; 5 Aug. 1964; E. L. Bousfield leg.; CMNC 1991-2584. 2 ♂&♀;

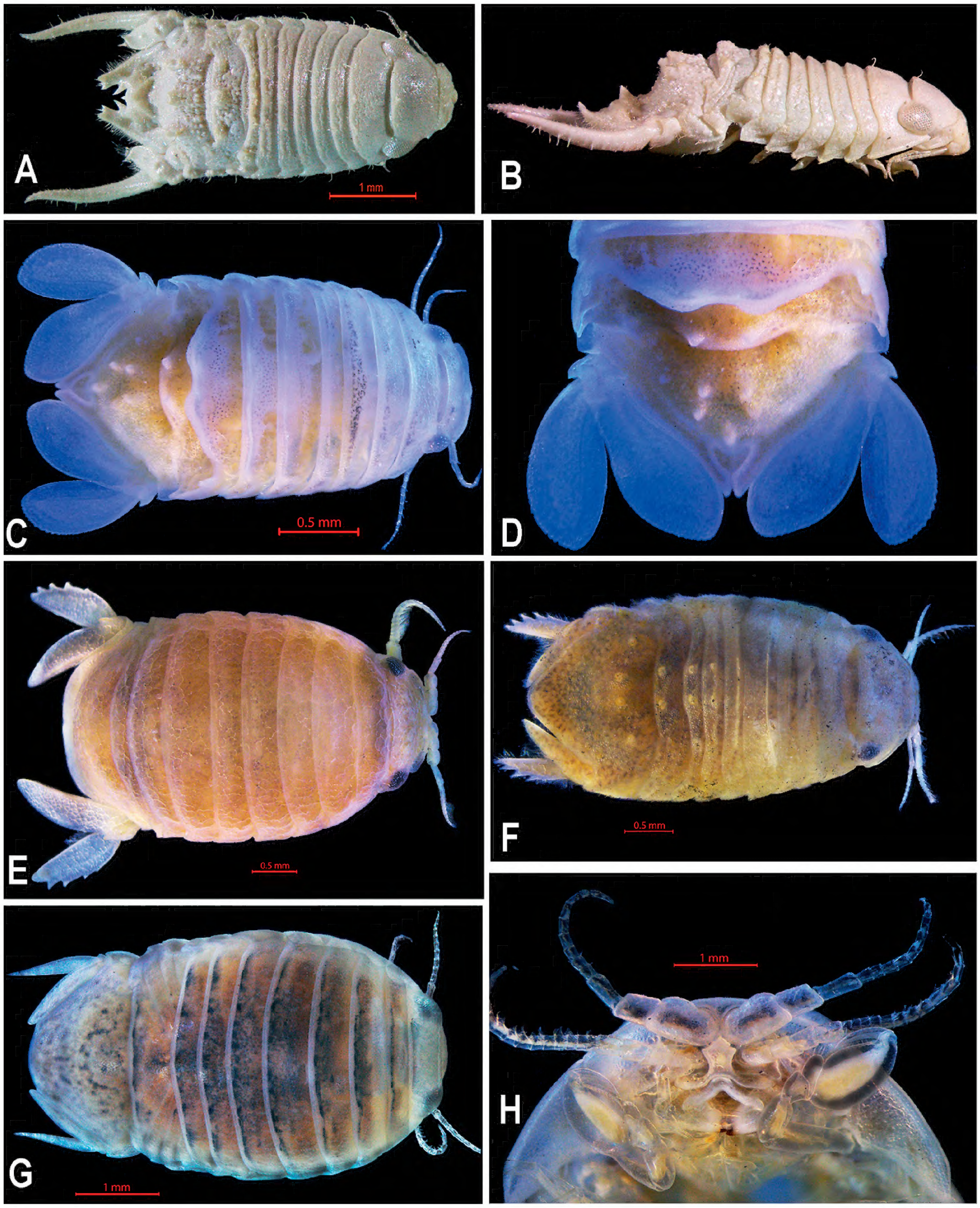

Figure 4. *Paracerceis sculpta* (Holmes, 1904), male, (CMNC 1992-0513). **A.** Dorsal view; **B.** Lateral view. *Paradella dianae* (Menzies, 1962), male, (CMNC 1990-0073); **C.** Dorsal view; **D.** Pleotelson, dorsal view; **E.** *Sphaeroma quadridentatum* (Say, 1818); **F.** *Sphaeroma terebrans*, Bate 1866. *Tecticeps convexus* Richardson, 1899, male, (CMNC 1992-0541); **G.** Dorsal view; **H.** Head ventral view.

British Columbia, Vancouver Island, Barclay Land Distr., Pachena Bay; 22 Jul. 1975; E. L. Bousfield leg.; CMNC 1991-2590. USA. 33 ♂&♀; Washington, Clallam Co., Crescent Bay; 27 Jul. 1966; E. L. Bousfield leg.; CMNC 1991-2550. 7 ♂&♀; Washington, Clallam Co., Shipwreck Pt.; 1 Aug. 1966; E. L. Bousfield leg.; CMNC 1991-2562. 2 ♀♀; Oregon, Tillamook Co., Cape Kiwanda; 16 Aug. 1966; E. L. Bousfield leg.; CMNC 1991-2574.

Distribution. Eastern Pacific, British Columbia, Oregon to California (Espinosa-Pérez and Hendrickx 2006).

Discussion

The first contribution to the knowledge of isopod taxonomy of North America was Say (1818), who described *Naesa depressus* and *N. ovalis* from the east Coast of North America; these species were later placed in the genus *Ancinus* and *Cassidinidea* by H. Milne Edwards (1840) and Hansen (1905), respectively. A third sphaeromatid isopod, *Sphaeroma quadridentatum*, was described by Say (1818) from Georgia and East Florida. Dana (1853) described *Spheroma oregonensis* from the Pacific Coast of North America; this species being transferred to the combination *Gnorimosphaeroma oregonense* (Dana, 1853) by Wetzer et al. (2021). Harger (1873) reported *Sphaeroma quadridentatum* (Say, 1818) to occur from Massachusetts to Florida. Historically, the major period of isopod documentation in North America was from Richardson's first major (1899) contribution to Kensley and Schotte's (1989) field guide. Prior to 1899, 75 isopod species had been recorded for North America. When Richardson (1899) worked on the North American Pacific Coast, she added 22 new species to the isopod fauna, including seven new sphaeromatids.

At the turn of the 20th century, in 1905, Harriet Richardson published her significant monograph on the isopod fauna of North America in the Bulletin of the U.S. National Museum. This contribution included all terrestrial, freshwater, and marine isopods and Tanaidacea. Out of about 240 marine isopod species, 31 species (≈13%) were from the family Sphaeromatidae. The next comprehensive account was given by Hatch (1947), who gave a systematic account of the Pacific Northwest crustacean isopods, reporting 70 species, most of them (51 species) being marine isopods, of which seven species (≈14%) were sphaeromatids. Schultz (1969), in "*How to know the marine isopod crustaceans*", listed 444 marine species known from the waters off the coasts of North America, of which 45 (≈10%) are sphaeromatid isopods. Finally, Kensley and Schotte (1989) reported about 280 shallow-water species from the Caribbean, of which 30 species (≈11%) were sphaeromatid isopods.

There are now 110 accepted genera and close to 650 named species of the sphaeromatoid isopods worldwide (Boyko et al. 2008 onwards). Given that there are approximately 6250 species of marine and estuarine isopods (Poore and Bruce 2012), sphaeromatoid isopods account for approximately 10% of the marine species. The ratio of North American sphaeromatids to the other marine isopods appears to be around 10% as well.

In recent decades, a few taxonomic studies of the North American marine isopod fauna have described or reported new species. For instance, *Paradella tiffany* Bruce & Wetzer, 2004, and *P. garsonorum* Wetzer & Bruce, 2007, are both described from Baja California, Mexico. Later, Bruce and Wetzer (2008) reported a *Pseudosphaeroma* Chilton, 1909 species from the Pacific coast of North America.

Wall et al. (2015) added three new north-eastern Pacific species, *Exosphaeroma paydenae*, *E. russellhansoni*, and *E. pentche*. Recently, Wetzer et al. (2021) revised *Gnorimosphaeroma oregonense* (Dana, 1852) from the north-eastern Pacific. Furthermore, Khalaji-Pirbalouty and Gagnon (2021) described *Dynoides canadensis* from the south-western coast of British Columbia, and *Cassidinidea ovalis*, a common species along the Atlantic Coast of North America, was redescribed by Khalaji-Pirbalouty and Bruce (2021). At last count, 70 species of sphaeromatid isopods have been reported from North America (Wall et al. 2015; Khalaji-Pirbalouty and Gagnon 2021; Wetzer et al. 2021). This accounts for roughly 10% of all reported sphaeromatid isopods worldwide. In comparison, Australia, with the length of its coastline approximately 15% of that of North America, has a rich sphaeromatid fauna with 203 recorded species, which are nearly 30% of all sphaeromatid species known worldwide (Poore et al. 2002; Bruce 2003, 2009; Poore 2005). Yet, it is estimated that the species number for this family in Australia is still about 50% of the expected total (Poore et al. 2002; Bruce 2003).

The relatively low number of North American sphaeromatid species may be, in part, related to the lower-diversity trends observed for most taxa in higher-latitude regions, particularly in the Northern Hemisphere. The number of known sphaeromatid species reported from Australia is about three times that of North America; it appears that temperate regions are more favorable for sphaeromatid isopods, as previously mentioned by Poore and Bruce (2012). There are clearly other major factors at play, such as the age of the crust around Australia, and also that the family may have primarily evolved and radiated largely in the Southern Hemisphere (unpublished results).

Taxonomic diversity at the family level and above, as reported here, would greatly benefit from the addition of new, fresh material from the field (particularly from under-collected regions and using finer scale methods that capture small crustaceans) which, beyond morphological examination, would provide the additional opportunity to run genetic analyses. There is, however, still lots of material to be examined in collections such as that of the CMN. Work by isopod taxonomists in these collections will likely result in the description of many new species (for instance, see Khalaji-Pirbalouty and Gagnon 2021), especially where there are lots of unexamined samples with unidentified species, or where previous identifications have not been reviewed by experts.

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